

IN THE CLAIMS:

1 1. (CANCELLED)

1 2. (CURRENTLY AMENDED) The method as defined in claim ~~4~~ 6 further comprising
2 ~~the step of:~~

3 acquiring the packet header data from the context memory internal to the
4 forwarding engine.

1 3. (CURRENTLY AMENDED) The method as defined in claim ~~6~~ 2 further comprising
2 ~~the steps of:~~

3 generating a bit mask associated with the acquired packet header data; and

4 transferring the bit mask ~~and the acquired packet header data~~ to the output buffer
5 of the forwarding engine.

1 4. (CANCELLED)

1 5. (CURRENTLY AMENDED) The method as defined in claim ~~4~~ 6 further comprising
2 modify the acquired packet header data while the packet header data is being transferred
3 to the output buffer by the steps of:

4 ~~searching the data structure for an entry containing information associated with a~~
5 ~~range of addresses that matches a range of addresses associated with the acquired packet~~
6 ~~header data;~~

7 if a matching entry is found, determining if an operation code contained in the
8 matching entry indicates a delete data operation; and

9 if so, generating a delete bit mask that represents data that is deleted in the
10 acquired packet header data and transferring the delete bit mask and the acquired packet
11 header data to the output buffer of the forwarding engine.

1 6. (PREVIOUSLY PRESENTED) A method for modifying packet header data
2 transferred to an output buffer, comprising:

3 initiating, by a processor, a transfer of acquired packet header data to the output
4 buffer;

5 accessing a data structure including one or more entries containing information
6 associated with a range of addresses and an operation code; and

7 modify the acquired packet header data while the packet header data is being
8 transferred to the output buffer by,

9 searching the data structure for an entry containing information associated
10 with a range of addresses that matches a range of addresses associated with the
11 acquired packet header data,

12 if a matching entry is found, determining if an operation code contained in
13 a matching entry indicates an insert data operation, and if so,

14 a) generating a leading bit mask that represents leading data
15 contained in the acquired packet header data,

16 b) transferring the leading bit mask and the acquired packet header
17 data to the output buffer,

18 c) acquiring insert data,

19 d) generating an insert data bit mask that represents the insert data,

20 e) transferring the insert data bit mask and the insert data to the
21 output buffer,

22 f) generating a lagging bit mask that represents lagging data
23 contained in the acquired packet header data, and
24 g) transferring the lagging bit mask and the acquired packet header
25 data to the output buffer.

1 7. (CURRENTLY AMENDED) The method as defined in claim-~~4~~6 wherein each entry
2 contains a length and a source address associated with the command.

1 8. (CURRENTLY AMENDED) The method as defined in claim 7 comprising~~the step~~
2 ~~of~~:

3 searching the data structure for an entry containing information associated with a
4 range of addresses specified by the combination of the length and the source address
5 contained in the entry that matches a range of addresses associated with the acquired
6 packet header data.

1 9. (CURRENTLY AMENDED) The method as defined in claim-~~4~~6 wherein the data
2 structure is a table.

1 10. (CURRENTLY AMENDED) The method as defined in claim-~~4~~6 comprising~~the~~
2 ~~step of~~:

3 clearing the data structure.

1 11-13. (CANCELLED)

1 14. (CURRENTLY AMENDED) The system as defined in claim-~~13~~17 wherein the data
2 structure is a table.

1 15. (CANCELLED)

1 16. (CURRENTLY AMENDED) The system as defined in claim ~~15~~17 wherein the data
2 mover is configured to ~~search the data structure for an entry containing information~~
3 ~~associated with a range of addresses that matches a range of addresses associated with the~~
4 ~~acquired packet header data and if a matching entry is found, determine if the operation~~
5 code contained in the matching entry indicates a delete data operation and, if so, generate
6 a delete bit mask that represents data that is deleted in the acquired packet header data.

1 17. (PREVIOUSLY PRESENTED) A system comprising:

2 a context memory configured to hold packet header data;

3 a data structure including one or more entries containing information associated
4 with a range of addresses and an operation code;

5 an output buffer; and

6 a data mover coupled to the context memory and the output buffer and configured
7 to, upon initiation of a transfer of packet header data from the context memory to the
8 output buffer, acquire the packet header data from the context memory, search the data
9 structure for an entry containing information associated with a range of addresses that
10 matches a range of addresses associated with the acquired packet header data and if a
11 matching entry is found, determine if the operation code contained in the matching entry
12 indicates an insert data operation and if so, (i) generate a leading bit mask that represents
13 leading data contained in the acquired packet header data, (ii) transfer the leading bit
14 mask and acquired packet header data to the output buffer, (iii) acquire insert data, (iv)
15 generate an insert data bit mask that represents the insert data, (v) transfer the insert data
16 bit mask and insert data to the output buffer, (vi) generate a lagging bit mask that
17 represents lagging data contained in the acquired packet header data, and (vii) transfer the
18 lagging bit mask and the acquired packet header data to the output buffer.

1 18. (CURRENTLY AMENDED) The system as defined in claim-~~15~~ 17 wherein each
2 entry in the data structure contains a length and a source address associated with the
3 command.

1 19. (PREVIOUSLY PRESENTED) The system as defined in claim 18 wherein the data
2 mover is configured to search the data structure for an entry containing information
3 associated with a range of addresses specified by the combination of the length and the
4 source address contained in the entry that matches a range of addresses associated with
5 the acquired packet header data.

1 20. (CURRENTLY AMENDED) The system as defined in claim-~~13~~ 17 wherein the data
2 mover is configured to generate a bit mask associated with the packet header data and
3 transfer the bit mask to the output buffer of the forwarding engine.

1 21. (PREVIOUSLY PRESENTED) The system as defined in claim 20 wherein the
2 output buffer of the forwarding engine comprises:
3 data steering logic configured to use the bit mask to identify valid data contained
4 in the transferred packet header data;
5 a working register coupled to the data steering logic and configured to hold the
6 valid packet header data transferred from the data steering logic; and
7 an output queue coupled to the working register and configured to hold the valid
8 packet header data transferred from the working register.

1 22. (CANCELLED)

1 23. (CURRENTLY AMENDED) The apparatus as defined in claim ~~22~~27 wherein the
2 means for acquiring is configured to acquire ~~comprising: means for acquiring the packet~~
3 header data from the context memory internal to the forwarding engine.

1 24. (CURRENTLY AMENDED) The apparatus as defined in claim ~~23~~27 comprising:
2 means for generating a bit mask associated with the acquired packet header data;
3 and
4 means for transferring the bit mask ~~and the acquired packet header data~~ to the
5 output buffer of the forwarding engine.

1 25. (CANCELLED)

1 26. (CURRENTLY AMENDED) The apparatus as defined in claim ~~25~~27 comprising:
2 ~~means for searching the data structure for an entry containing information~~
3 ~~associated with a range of addresses that matches a range of addresses associated with the~~
4 ~~acquired packet header data;~~
5 means for determining if the operation code contained in a matching entry
6 indicates a delete data operation; and
7 means for generating a delete bit mask that represents data that is deleted in the
8 acquired packet header data and transferring the delete bit mask and the acquired packet
9 header data to the output buffer, if the operation code in the matching entry indicates a
10 delete data operation.

1 27. (PREVIOUSLY PRESENTED) An apparatus comprising:
2 means for acquiring packet header data;

3 means for accessing a data structure including one or more entries containing
4 information associated with a range of addresses and an operation code;

5 means for searching the data structure for an entry containing information
6 associated with a range of addresses that matches a range of addresses associated with the
7 acquired packet header data;

8 means for determining if the operation code contained in a matching entry
9 indicates an insert data operation; and

10 means for modify the acquired packet header data while the packet header data is
11 being transferred to an output buffer by (i) generating a leading bit mask that represents
12 leading data contained in the acquired packet header data, (ii) transferring the leading bit
13 mask and the acquired packet header data to the output buffer, (iii) acquiring insert data,
14 (iv) generating an insert data bit mask that represents the insert data, (v) transferring the
15 insert data bit mask and the insert data to the output buffer, (vi) generating a lagging bit
16 mask that represents lagging data contained in the acquired packet header data, and (vii)
17 transferring the lagging bit mask and the acquired packet header data to the output buffer,
18 if the operation code indicates an insert data operation.

1 28. (CANCELLED)

1 29. (CURRENTLY AMENDED) The computer readable medium as defined in claim
2 ~~2833~~ comprising computer executable instructions for execution in a processor for:

3 acquiring the packet header data from the context memory internal to the
4 forwarding engine.

1 30. (CURRENTLY AMENDED) The computer readable medium as defined in claim
2 ~~2933~~ comprising computer executable instructions for execution in a processor for:

3 generating a bit mask associated with the acquired packet header data; and

4 transferring the bit mask and the acquired packet header data to the output buffer
5 of the forwarding engine.

1 31. (CANCELLED)

1 32. (CURRENTLY AMENDED) The computer readable medium as defined in claim
2 ~~33~~ comprising computer executable instructions for execution in a processor for:

3 ~~searching the data structure for an entry containing information associated with a~~
4 ~~range of addresses that matches a range of addresses associated with the acquired packet~~
5 ~~header data;~~

6 if a matching entry is found, determining if an operation code contained in the
7 matching entry indicates a delete data operation; and

8 if so, generating a delete bit mask that represents data that is deleted in the
9 acquired packet header data and transferring the delete bit mask and the acquired packet
10 header data to the output buffer of the forwarding engine.

1 33. (CURRENTLY AMENDED) ~~A~~ The computer readable medium as defined in claim
2 ~~31~~ comprising computer executable instructions for execution in a processor for:

3 initiating a transfer of the packet header data to an output buffer;

4 accessing a data structure including one or more entries containing information
5 associated with a range of addresses and an operation code; and

6 modify the packet header data while the packet header data is being transferred to
7 the output buffer by,

8 searching the data structure for an entry containing information associated
9 with a range of addresses that matches a range of addresses associated with the
10 acquired packet header data,

11 if a matching entry is found, determining if an operation code contained in
12 a matching entry indicates an insert data operation, and if so,
13 a) generating a leading bit mask that represents leading data contained in
14 the acquired packet header data,
15 b) transferring the leading bit mask and the acquired packet header data to
16 the output buffer,
17 c) acquiring insert data,
18 d) generating an insert data bit mask that represents the insert data,
19 e) transferring the insert data bit mask and the insert data to the output
20 buffer,
21 f) generating a lagging bit mask that represents lagging data contained in
22 the acquired packet header data, and
23 g) transferring the lagging bit mask and the acquired packet header data to
24 the output buffer.

1 34. (PREVIOUSLY PRESENTED) A method comprising:
2 reading one or more instructions, by a processor of a forwarding engine,
3 indicating an operation is to be performed on packet header data;
4 generating, in response to the one or more instructions, one or more commands
5 associated with the operation;
6 placing the one or more commands in a data structure;
7 initiating a transfer of the packet header data from a context memory internal to
8 the forwarding engine to an output buffer of the forwarding engine;
9 searching the data structure for an entry containing information associated with a
10 range of addresses that matches a range of addresses associated with the packet header
11 data;

12 determining from the entry that the operation is an insert data operation; and
13 performing the insert data operation, by a device operating independently from
14 the processor, by determining a leading portion of the packet header data, transferring the
15 leading portion of the packet header data to the output buffer, acquiring insert data,
16 transferring the insert data to the output buffer of the forwarding engine, determining a
17 lagging portion of the packet header data, and transferring the lagging portion of the
18 packet header data to the output buffer of the forwarding engine.

1 35. (NEW) The method as defined in claim 34 further comprising:

2 reading one or more additional instructions, by the processor of the forwarding
3 engine, indicating another operation is to be performed on additional packet header data;

4 generating, in response to the one or more additional instructions, one or more
5 additional commands associated with the another operation;

6 placing the one or more additional commands in the data structure;

7 initiating a transfer of the additional packet header data from the context memory
8 internal to the forwarding engine to the output buffer of the forwarding engine;

9 searching the data structure for an entry containing information associated with a
10 range of addresses that matches a range of addresses associated with the additional packet
11 header data;

12 determining from the entry that the another operation is a delete data operation;

13 and

14 performing the delete data operation, by the device operating independently from
15 the processor, by determining a portion of the additional packet header data to be deleted
16 and transferring the additional packet header data other than the portion of the additional
17 packet header data to be deleted to the output buffer of the forwarding engine.

1 36. (NEW) The method as defined in claim 34 wherein each entry contains a length and
2 a source address.

1 37. (NEW) The method as defined in claim 34 further comprising:
2 clearing the data structure.

1 38. (NEW) A system comprising:
2 a context memory configured to hold packet header data;
3 a data structure including one or more entries;
4 an output buffer;
5 a processor configured to read one or more instructions indicating an operation is
6 to be performed on the packet header data, generate, in response to the one or more
7 instructions, one or more commands associated with the operation, place the one or more
8 commands in the data structure, and initiate a transfer of the packet header data from the
9 context memory to the output buffer; and
10 a data mover coupled to the context memory and the output buffer, and
11 configured to operate independently from the processor, the data mover further
12 configured to search the data structure for an entry containing information associated
13 with a range of addresses that matches a range of addresses associated with the packet
14 header data, determine from the entry that the operation is an insert data operation, and
15 perform the insert data operation by determination of a leading portion of the packet
16 header data, transfer of the leading portion of the packet header data to the output buffer,
17 acquisition of insert data, transfer of the insert data to the output buffer, determination of
18 a lagging portion of the packet header data, and transfer of the lagging portion of the
19 packet header data to the output buffer.

1 39. (NEW) The system as defined in claim 38, wherein

2 the processor is further configured to read one or more additional instructions that
3 indicate another operation is to be performed on additional packet header data, generate,
4 in response to the one or more additional instructions, one or more additional commands
5 associated with the another operation, place the one or more additional commands in the
6 data structure, and initiate a transfer of the additional packet header data from the context
7 memory to the output buffer, and

8 the data mover is further configured to search the data structure for an entry
9 containing information associated with a range of addresses that matches a range of
10 addresses associated with the additional packet header data, determine from the entry that
11 the another operation is a delete data operation, and perform the delete data operation by
12 determination of a portion of the additional packet header data to be deleted and transfer
13 of the additional packet header data other than the portion of the additional packet header
14 data to be deleted to the output buffer.